Hydroids from Ricketts Point and Black Rock, Victoria

Jeanette E Watson[1] and the late Daniel E. McInnes[2]

Abstract

Daniel McInnes, naturalist and microbiologist (3/10/1906–24/9/98) left many notes but published few results of his observations over many years on the Hydrozoa from Port Phillip Bay. In this paper his research notes on hydroids collected during the 1980s are collated and edited. The paper describes six species of athecate hydroids, two of which are first records for their respective genera in Australia, two are Australian species not reported since their first description and four thecate species including one probably new species. (*The Victorian Naturalist* **116** (3), 1999, pp. 102-111).

Introduction

Daniel McInnes, naturalist and microbiologist (3/10/1906 – 24/9/98) left many notes but published few results of his observations over many years on the Hydrozoa of Port Phillip Bay. During the 1980s he regularly collected intertidal and shallow water hydroids from the Melbourne seaside suburbs of Black Rock (37° 58' S, 145° 01' E) and Ricketts Point (38° 00' S, 145°02' E) in Beaumaris. He found many hydroids growing on common seaweeds near shore and in tide pools on the rock platform. Species on which he found hydroid epiphytes were the green alga *Ulva*, holdfasts and thalli of the brown kelps *Ecklonia radiata* and *Cystophora* sp. and the red coralline alga *Corallina officinalis*.

He examined his collections in the small laboratory and seawater aquarium at his home in the suburb of Malvern. The aquarium system consisted essentially of aerated glass tanks and an array of plastic containers. Interesting specimens selected under the microscope were isolated in glass petrie dishes in the containers. Hydroids that particularly caught his attention were the small, cryptic species which have received little study in Australia. A detailed account of his collection methods and aquarium maintenance are given in McInnes (1982).

He kept a behavioural diary of his aquarium specimens, including copious weekly, daily and sometimes hourly notes and diagrams of interesting specimens. (One such note plaintively asks 'Oh! where has my medusa gone?' An hour later according to his diary, the errant medusa was found hidden under algae.) Although his measurements and drawings are accurate, unfortunately he left no preserved or mounted voucher or type specimens, presumably because he continued observations until the specimens died.

A difficulty I encountered in reviewing his data is that in many instances, he did not name the specimens under observation, providing only a reference such as 'hydroid in red container 3'. Those specimens which he was able to name were usually correct to genus and generally to species; often, however, these were old names now synonymised in the modern literature.

I suspect that his lack of rigorous scientific publication was a matter of diffidence and that he (quite wrongly) considered himself to be an amateur whose efforts in taxonomy would be unworthy of scientific recognition. As a tribute to his work I now try to set the record straight. I have been able to extract and summarise from his notes the following information: two species are first records of their respective genera from Australia; two species have not been reported in Australia since their first description and gaps in life histories of some others have now been filled. Because of insufficient information and unfinished sketches I regretfully exclude several other unusual athecate species. Three thecate species including one almost certainly new to science are reported and other common athecate and thecate hydroids he found on algae are listed. For clarity in publication it has been necessary to redraw many of his sketches from the microscope. In keeping with what I am sure would have been his wish, in this paper he is referred to simply as 'Dan'.

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Subclass Anthoathecata
Family Clavidae McCrady, 1859
***Clava* Gmelin, 1791**
***Clava* sp.**
Fig. 1A

Material

Colony collected 7/3/85 from underside of *Ecklonia radiata* holdfast; colony survived until 18/4/85. Another colony of many dozens of hydranths collected 8/4/87.

Description

Hydranths arising directly from a creeping stolon; stolon and hydranth pedicel covered by thin perisarc. Hydranth cylindrical, young hydranth with four oral tentacles, probably moniliform, 0.3–0.4 mm long but tentacles not in a whorl; hypostome clavate. Tentacles increasing in number to 18, scattered over hydranth body, older (distal) tentacles up to 0.8 mm in length, proximal ones shorter. Hydranth up to 2 mm high at

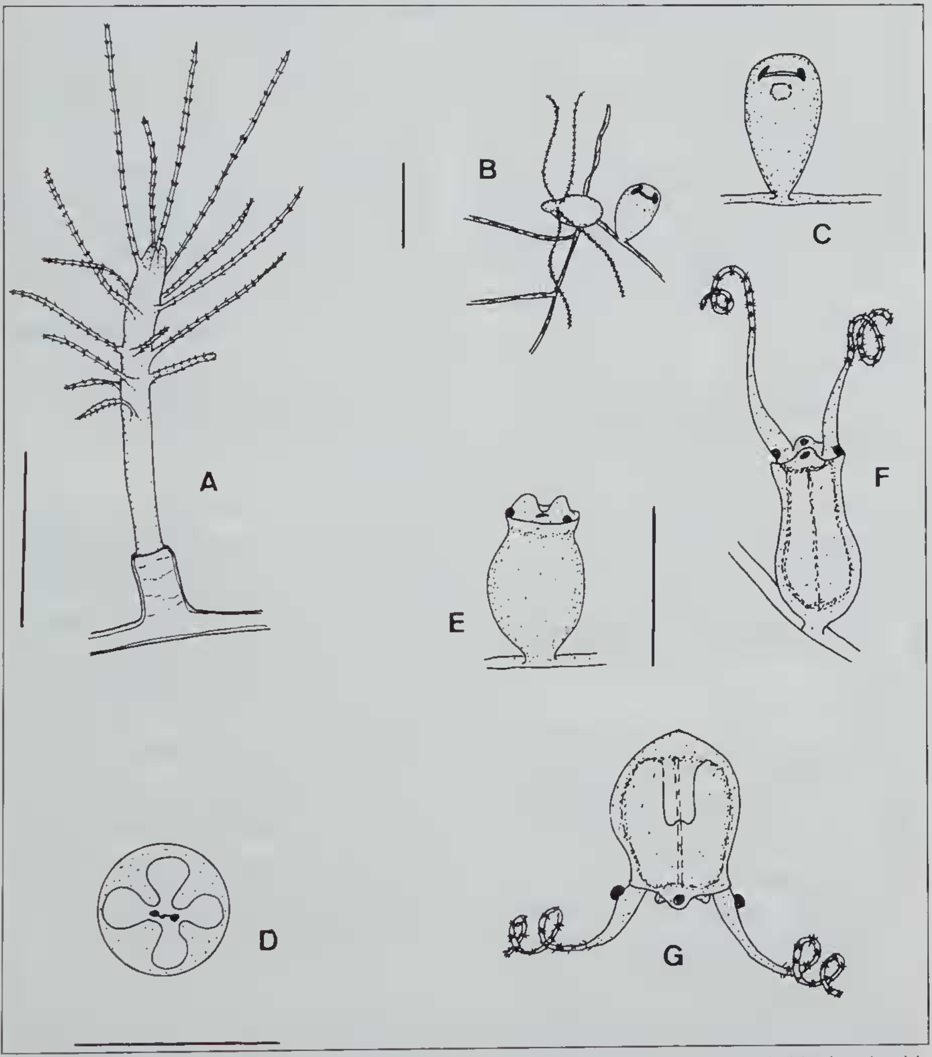

Fig. 1A-G. A, *Clava* sp., extended hydranth. B-G, *Rathkea octopunctata*, B, extended hydranth with four tentacles and medusa bud, C, medusa bud, enlarged, showing spots, D, apical view of medusa bud, E, more advanced medusa with tentacle bulbs, F, medusa with newly extended tentacles, G, liberated medusa. Scale bar: 0.5 mm.

maturity, pedicel about 1.2 mm long.

Colour Hydranths colourless to grey.

Remarks

One stolon grew to a length of 8.5 mm. The number of tentacles on the hydranth increased from four to 10 over a period of nine days. During this time one of the hydranths was observed feeding on an amphipod.

One of the problems encountered in rearing very small hydroid colonies detached from their substrate is inducing re-attachment to new substrata in the aquarium. Dan apparently successfully solved this with *Clava* by embedding the stolons in a blob of petroleum jelly on the bottom of a petrie dish.

This may be the species listed by Dan as *Turris neglecta* Lesson (McInnes 1982). In the absence of reproductive structures and without information on the cnidome the species cannot be identified. There are no previous records of the genus *Clava* from Australia.

Family Rathkeidae Russell, 1953

***Rathkea* Brandt, 1838**

***Rathkea octopunctata* (M. Sars, 1835)**

Fig. 1B-G

Cytaeis octopunctata M. Sars, 1835: 38, pl. 6, figs 14a-g.
Rathkea octopunctata- Russell, 1953: 137, pl. 7, figs 3-4, text-figs 65A-E, 66, 67A-B.- Southcott, 1982: 130, fig. 4.20a, b.- Schuchert, 1996: 49, fig. 34a-c.- Watson, 1998.

Material

Colonies first found in 1982. Colonies collected in April 1986 were maintained in aquaria until November 1986, during which period the hydranths multiplied on glass to 30 - 40 individuals and at least two medusae were released.

Description

Colonies stolonal, hydranths arising from a ramified, creeping hydrorhiza. Hydranths pyriform to spindle-shaped, capable of extension to 0.3 mm, with four thread-like filiform oral tentacles up to 2 mm in length.

Juvenile gonophores ovoid, 0.5 mm high and 0.3 mm wide, borne erect from stolon on a very short pedicel. Viewed from above, the young medusa within the gonophore has four thick internal lobes, probably radial canals, and two central red spots connected by a thin red line (Fig. 1D). After four days the gonophore became vase-shaped with two opposite, protruding, thick tentacle bulbs; base of bulbs with red spots. At this stage the medusa commenced pulsing inside the gonophore.

Over several hours the gonophore extended to 0.6 mm in length and the two tentacle bulbs became elongated into two long, filiform tentacles armed with nematocysts in the distal third; two more thick tentacle bulbs appeared opposite the original tentacles. The red spots, present at the base of each bulb, now enlarged into perradial vesicles.

Several hours later, the medusa was released. At this stage the umbrella was balloon-shaped, 0.6 mm high and 0.4 mm wide, slightly thickened apically, with faint radial canals passing down the umbrella to the tentacle bases. A quadrangular manubrium extended more than halfway through the bell; mouth a simple broad disk. The gonophore remained as a transparent deflated sheath. The observations ended with death of the medusa.

Remarks

There are five known species of *Rathkea* medusae (O'Sullivan 1984), of which *Rathkea formosissima* and *Rathkea octopunctata* have been reported from New Zealand (Schuchert 1996) and *R. octopunctata* from Port Phillip Bay, Australia (Southcott 1982). Of these species, only the hydroid stage of *R. octopunctata* has been conclusively associated with its medusa (Russell 1953). Watson (1998) recorded an infertile hydroid growing on a muddy bottom in the Geelong Arm of Port Phillip Bay and doubtfully referred it to that species. Dan's sketch of the hydroid exactly matches the description and figure of *Rathkea octopunctata* given by Watson (1998).

The newly liberated medusa of *R. octopunctata* from the parent hydroid has never previously been described, the smallest specimens taken from the plankton of the British Isles being about 1 mm in height (Russell 1953). Only adult specimens 2.5–4 mm high have been reported from the plankton of New Zealand (Schuchert

1996) and Australia (Southcott 1982).

A puzzling aspect is the red spots, developing into prominent pustules near the base of the tentacles. As they occur on the tentacle and not the circular canal, these are not ocelli which, in any case, are excluded from the family definition of the Rathkeidae. No such structures are mentioned in descriptions of more advanced medusae; it is possible that these are lost as the medusa matures.

The family definition of Rathkeidae also includes short oral arms on the manubrium and multiple sets of tentacles on the adult medusa. Increase in the number of tentacles is a common event in maturation of hydrozoan medusae so it is equally possible that in this species the oral tentacles may also grow at a later stage of development.

Until the report by Watson (1998) and the present account, the hydroid of *R. octopunctata* was known only from some cultured specimens reared in overseas laboratories (Russell 1953, Werner 1958). This account fills a gap in the natural life history of the species.

Family Corynidae Johnston, 1836
Coryne Gaertner, 1774
Coryne sp.
Fig. 2A

Material

Collected from holdfast of *Ecklonia radiata*, 24/4/85; no other information.

Description

Part of a small colony, simple and sparsely branched, diameter of branch 0.25 mm, perisarc almost smooth, reaching to base of hydranth. Hydranth 1.5 mm long, with an oral whorl of four capitate tentacles and (probably) 16–18 capitate tentacles scattered over body. Gonophores are fixed sporosacs scattered among tentacles; gonophore balloon-shaped, about 0.5 mm long with a short peduncle and thick clear pellicle; sex probably male.

Colour Sporosac orange.

Remarks

The specimen bears some similarities to *Coryne* sp.1 of Schuchert (1996), small colonies of which were found on stones and other cryptic habitats in New Zealand. Unfortunately, without information on the cnidome of Dan's specimen, no further identification is possible. This is the first record of the genus *Coryne* from Australia.

Dicoryne Allman, 1859
Dicoryne annulata von Lendenfeld, 1884
Fig. 2B

Dicoryne annulata von Lendenfeld, 1884: 490, pl. 17, fig. 30.

Material

Colonies collected 17/5/82, 10/9/82, 5/11/82. Another colony collected from red coralline alga 22/1/82.

Description

Colonies infertile. No information on hydrorhiza. Hydranth pedicel cylindrical, 0.6 mm long, 0.18 mm wide, perisarc moderately thick, deeply annulated. Extended hydranth 1.3–1.5 mm long, spindle-shaped, with 16–18 distal filiform tentacles to 0.8 mm long, hypostome an open annulus.

Remarks

This is undoubtedly *Dicoryne annulata* described by von Lendenfeld from Port Phillip Bay.

Dan left no information on the species other than the scale drawing of the hydranth and hydranth bud. The species has not been recorded since its first description.

Sarsia Lesson, 1843
Sarsia radiata von Lendenfeld, 1884
Fig. 2C

Sarsia radiata von Lendenfeld, 1884: 583, pl. 20, figs 31, 32.- Watson, 1978: 305, fig. 2A-D.

Material

Collected 25/4/82; no other information.

Description

Hydranth 1 mm high, arising from a stolon (not sketched). Hydranth with four oral tentacles and nine to 10 tentacles scattered over body; all tentacles long, capitate, capitulum armed with nematocysts. Medusa 0.7 mm long and 0.6 mm wide, on a short pedicel below proximal tentacles, umbrella balloon-shaped, with four radial canals and four long tentacles armed with nematocysts; velum broad, almost quadrate in shape, opening small, circular. Manubrium cylindrical narrowing to a simple mouth.

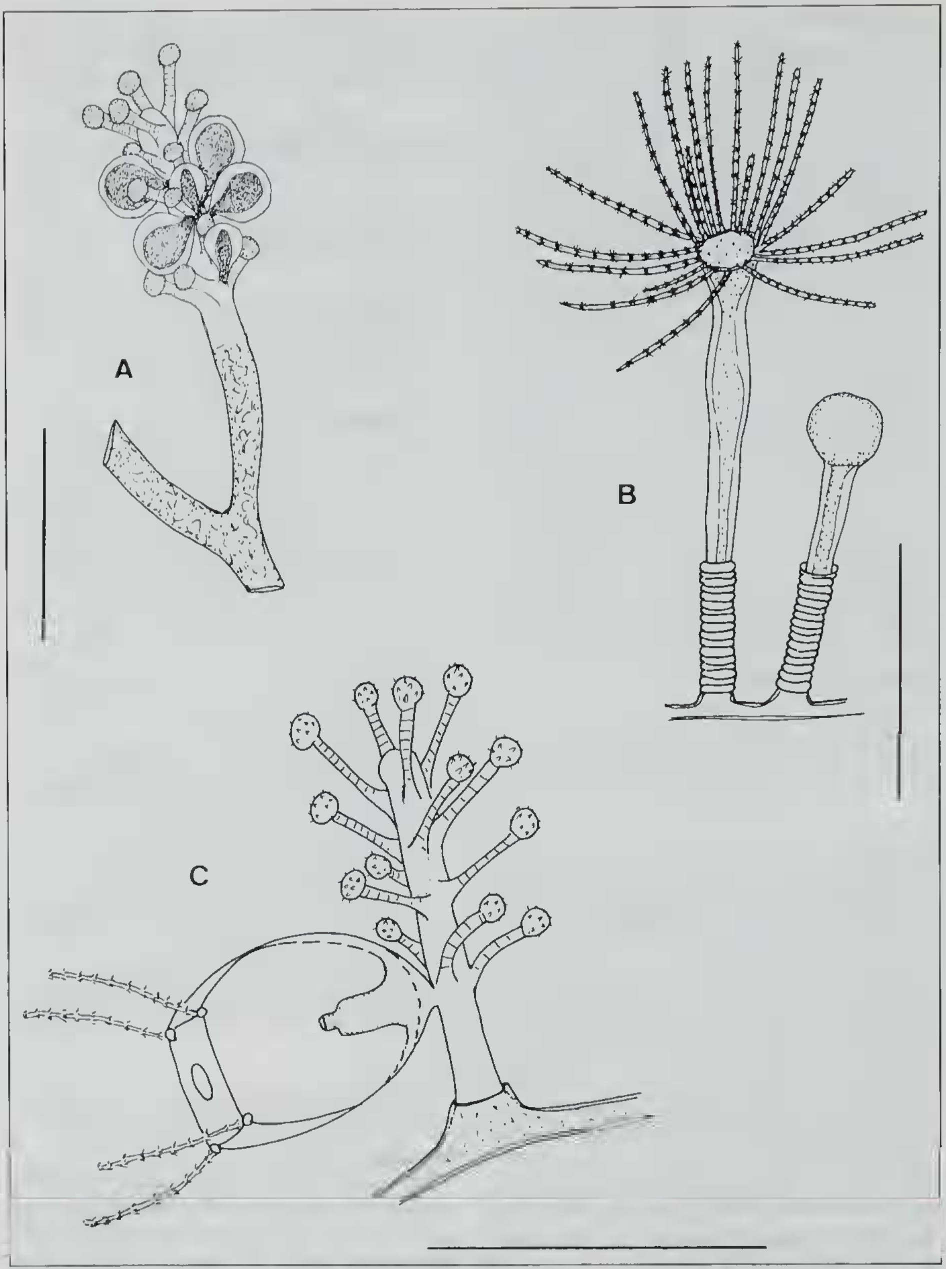

Fig. 2A-C. A, *Coryne* sp., simple branch with hydranth and sporosacs. B, *Dicoryne annulata*, extended hydranth and hydranth bud. C. *Sarsia radiata*, extended hydranth and medusa about to be released. Scale bar: A, 0.5 mm, B, C, 1 mm.

Remarks

This is probably the species referred by Dan to *Stauridiosarsia producta* (Wright), (see McInnes 1982: 163). Although he provided no notes and his sketch lacks detail, especially in relation to the basal perisarc of the hydroid, the species is clearly *Sarsia radiata*, previously reported from Port Phillip Bay by Watson (1978). The medusa was released in the aquarium.

Family Aequoreidae Eschscholtz, 1829
Aequorea Péron & Lesueur, 1810
Aequorea sp.
Fig. 3A-C

Material

Hydroid colony with medusa bud collected 25/4/82; medusa released in laboratory from colony. Medusa collected 5/11/82. Dan noted (26/9/86), that the colonies had been 'in the (petrie) dishes for years, giving birth to medusae, and are the toughest of all hydroids, despite very cold to very hot weather and "crook" seawater'.

Description

Colony stolonal, hydrorhiza tubular, creeping. Hydranth and medusa buds arising on short annulated pedicels from hydrorhiza: pedicel expanding distally from base. Hydranth 2.5 mm long, spindle-shaped, body slightly swollen below tentacle ring. Hydranth with 12 probably moniliform tentacles 2 mm long, a large basal tentacle web 0.25 mm wide; hypostome circular.

Cnidome of hydroid consisting of two size classes of nematocysts, probably isorhizas:

1) capsule bean-shaped, 7.5 × 3.5 μm tubule 350 μm long.
2) capsule bean-shaped, 15 × 7.5 μm, tubule 100 μm long.

Medusa buds borne on hydrorhiza and hydranth pedicel, the more advanced bud 0.5 mm high and 0.4 mm wide, showing a well developed manubrium and radial canals. Medusa at release balloon-shaped, bell 0.6 mm high and 0.6 mm wide, with four radial canals and a cylindrical

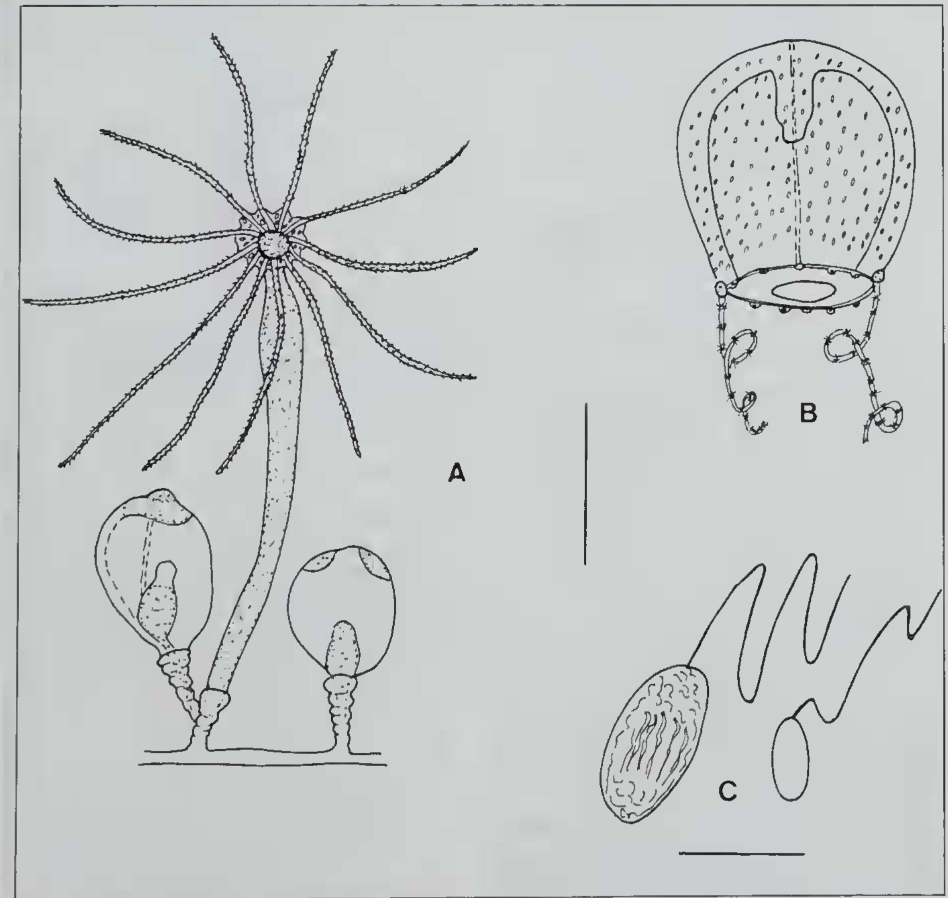

Fig. 3A-C. *Aequorea* sp., A, hydranth and medusa buds, B, newly liberated medusa, C, nematocysts from hydranth. Scale bar: A, B, 0.5 mm, C, 10 μm.

manubrium narrowing to simple tubular lips; exumbrella covered by numerous scattered large nematocysts, base of bell with two opposite long moniliform tentacles with swollen bulbs and two opposite perradial tentacle bulbs at base of radial canals, ring canal narrow, eight interradial marginal vesicles with concretions, velum broad.

Remarks

There is indication in his laboratory notes (see McInnes 1982: 163) that Dan assumed this hydroid to be a species of *Perigonimus* Sars. However, the medusa has features described for juveniles of *Aequorea forskalea* (Péron and Lesueur 1809) in the concretionary vesicles of the ring canal, and of *Aequorea vitrina* Gosse, 1853, in the almost complete cover of the exumbrella by large nematocysts.

The figured cnidome is from the tentacle web of the hydroid and it is possible that these, and the tentacular nematocysts, are different from those of the medusa. The nematocysts cannot be further identified as there is no information on the armature of the tubule.

The problem with precise identification of species of *Aequorea* is that the hydroid and early life histories of most common *Aequorea* medusae in the world plankton are virtually unknown. A further complicating factor is that the relatively large adult medusae bearing many tentacles bear little resemblance to juvenile forms. It is likely that the hydroid *Aequorea phillipensis* Watson 1998 from Port Phillip Bay is the same as that found by Dan; however, this can only be ascertained with collection of more material and further laboratory study.

Family Cladonematidae Gegenbauer, 1857
Staurocladia haswelli (Briggs, 1920)
Fig. 4A, B

Cnidonema haswelli Briggs, 1920: 93 - 104, pls 17, 18.

Material

Several colonies collected from coralline alga, 14/1/82; colony attached to glass of aquarium; observations proceeded until 9/3/82.

Description

New hydranths spindle-shaped, arising about 1 mm apart from a reptant stolon about 0.15 mm diameter; juvenile hydranth with three capitate tentacles increasing to four or five after seven to 10 days, mature hydranth at that stage about 1.5 mm long with a clavate hypostome; medusa buds appear as bulges on lower body and stolons. Medusa small, with four groups of bifurcate tentacles, each with an ocellum at base. Buds grew over four days, in which time the tentacles lengthened with one bifurcation longer than the other. Medusae were released after four to five days, creeping on floor of aquarium. At this stage the aboral tentacles were shorter, each bearing five nematocyst pads - a large terminal pad, two closely adjacent pads a short distance down the tentacle, a smaller pad, almost opposite, and one small pad opposite the bifurcation. The lower, longer (oral) tentacles without nematocysts, but with a bluntly pointed end.

The medusae lived for four days after release during which time 18 tentacles developed and several new medusa buds commenced growth around the manubrium of the parent.

Remarks

Although Briggs (1920) collected many medusae and wrote a detailed account of *Staurocladia haswelli* from the Sydney region, he never discovered the parent hydroid. From Dan's description and sketches there is no doubt that this is the first record of the hydroid of *S. haswelli*. Except for the absence of a ring of aboral tentacles the hydroid resembles other known polyps of *Staurocladia*; the absence of these tentacles may be a normal character of *S. haswelli* or possibly a consequence of the specimens being reared in an aquarium.

Dan mentions that the medusae were fed on amphipods and the hydranths on tubifex worm cut into very small pieces.

Subclass Leptothecata
Family Syntheciidae Marktanner-Turneretscher, 1890
Hincksella Billard, 1918
Hincksella cylindrica (Bale, 1888)
Fig. 4C

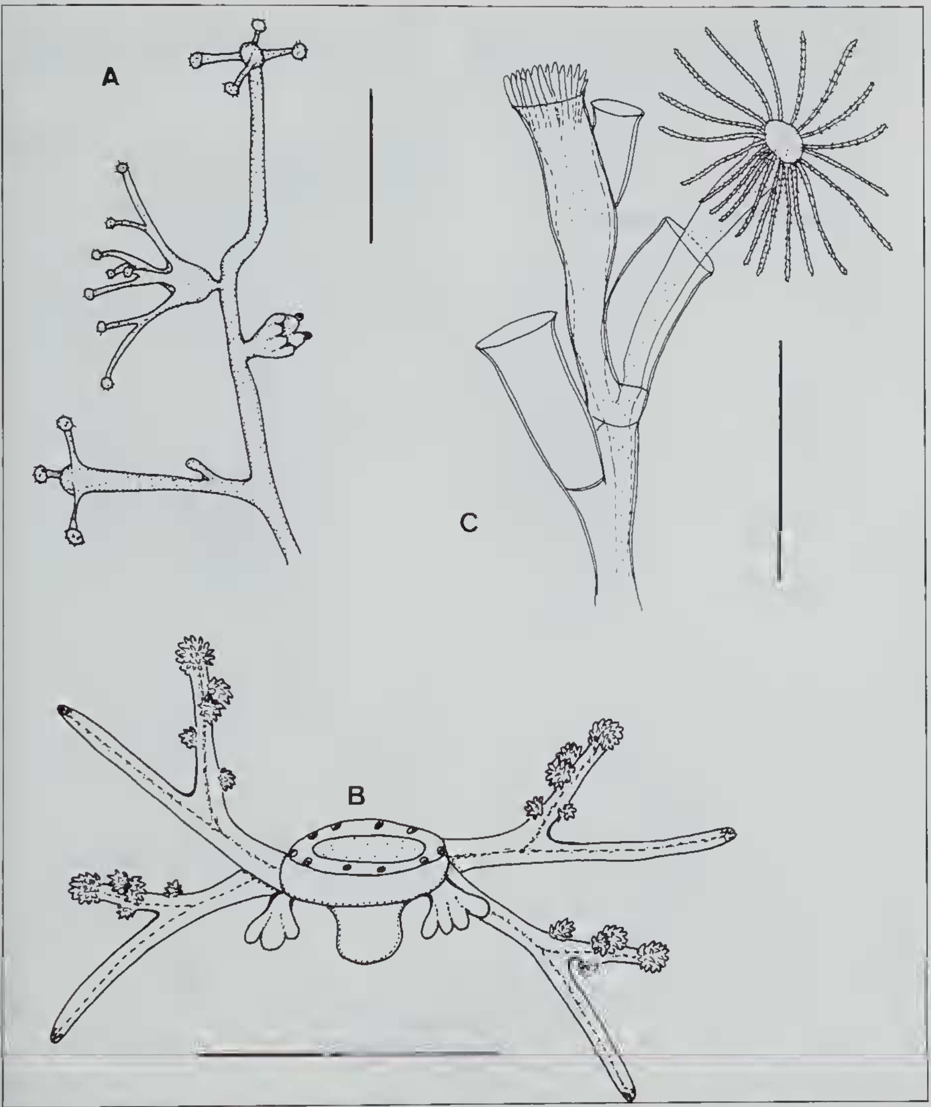

Fig. 4A-C. A, B, *Staurocladia haswelli*, A, colony with hydranths and medusa bud with developing medusae, B, medusa, showing two sets of tentacles only, and medusa buds. C, *Hincksella cylindrica*, hydrothecae and extended hydranth. Scale bar: 1 mm.

Sertularella cylindrica Bale, 1888: 765, pl. 16, fig. 7.- Ralph, 1966: 163.

Material

Colony collected on *Ecklonia* holdfast, February 1985, maintained for approximately eight weeks in aquarium to May, 1985.

Remarks

Dan was uncertain whether the colony with faintly undulated hydrothecae was *Hincksella corrugatum* Millard, 1958 with corrugated hydrothecae or *Hincksella cylindrica* (Bale 1888) with smooth hydrothecae. Ralph (1966) was also uncertain to which species her faintly corrugated specimens from Port Phillip Bay should be referred. As the hydrothecae of Dan's specimens are smooth the species is here assigned to *H. cylindrica*. Probably detailed studies will eventually show the two to be conspecific.

Thecate hydroids are well known to be

intractable aquarium subjects so it is a remarkable achievement to have maintained a thecate colony over this period of time in relatively primitive laboratory conditions.

Family Haleciidae Hincks, 1868
Halecium Oken, 1815
Halecium fragile Hodgson, 1950
Fig. 5A

Halecium fragile Hodgson, 1950: 15, fig. 11a-d.

Material

Colony collected 16/10/82; no other information.

Remarks

This collection date is the first record of the species from Port Phillip Bay.

Halecium sp.
Fig. 5B

Material

Colonies collected twice, the first on

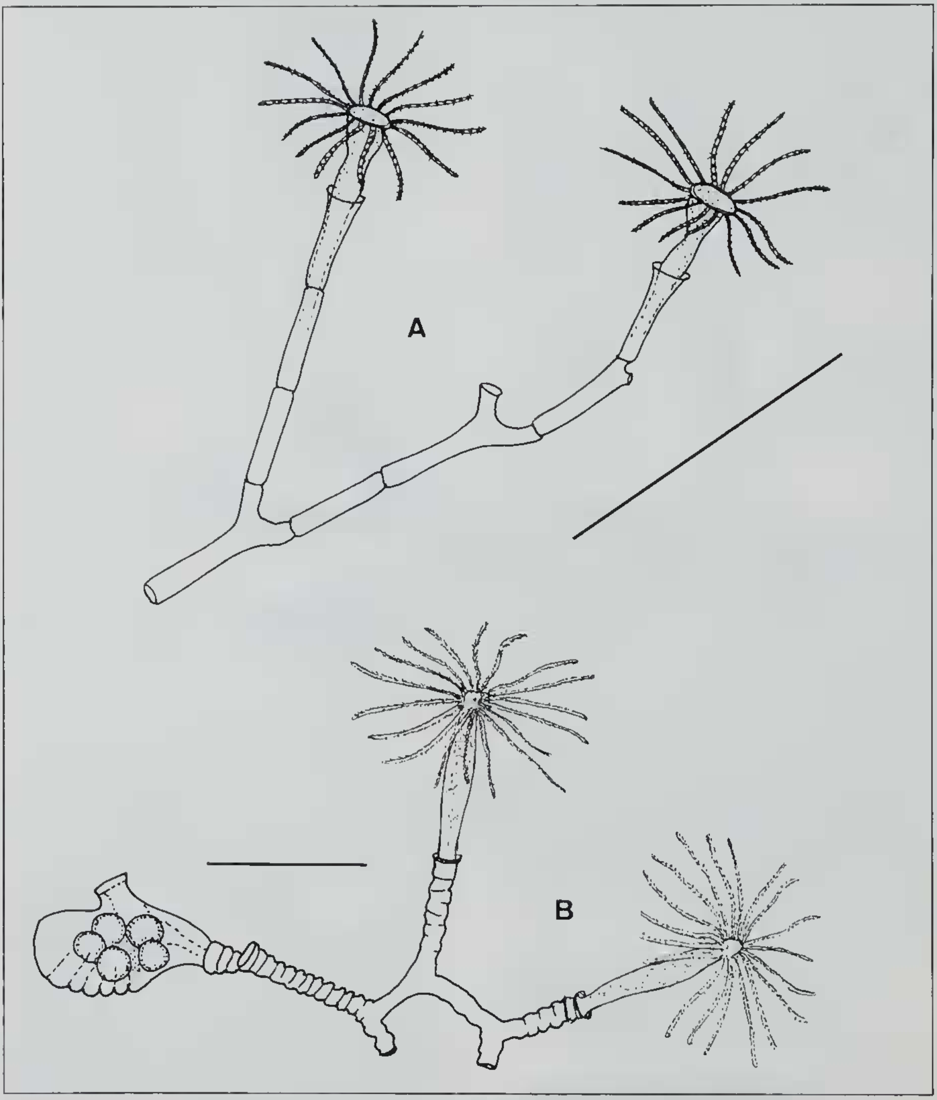

Fig. 5A and 5B. A, *Halecium fragile*, stem and extended hydranths. B, *Halecium* sp., hydrorhiza, hydranths and gonotheca. Scale bar: 1 mm.

2/4/82, the second collection a fertile colony from weed, 25/10/82; this colony maintained in aquarium until 27/12/82.

Description

Hydrorhiza a creeping undulated stolon; hydrothecal pedicels 0.25–0.35 mm high, 0.12–0.13 mm diameter, arising singly at intervals from hydrorhiza; pedicels deeply annulated. Hydrophore shallow dish-shaped (but not clearly figured), hydranth tall, spindle-shaped, with 18–20 tentacles. Gonotheca borne on a short annulated pedicel from hydrorhiza or from side of hydrothecal pedicel, mitten-shaped, aboral side deeply ridged, 0.6 mm long and 0.5 mm wide, orifice (probably) cylindrical, 0.13 mm in diameter, possibly with slightly everted rim. One gonotheca containing several spherical ova.

Remarks

Dan figured the species but left no notes, assuming it to be *Halecium corrugatissimum* Trebilcock, 1928. However, *H. corrugatissimum* is a tall, arborescently branched hydroid, not stolonal as is this species. As there is no other known *Halecium* similar to Dan's figure it is almost certainly an undescribed species. Verification must, however, await the finding of more material.

Supplementary Species List

At various times Dan found other common hydroid species on algae. The list (Table 1) is extracted from his notes (1982-1985) and from McInnes (1982: 163).

Table 1. Common Hydroids on Algae from Ricketts Point and Black Rock.

Species	**Habitat**
Eleutheria dichotoma Quatrefages, 1842	corallines
Eudendrium capillare Alder, 1856	brown alga
Silicularia rosea Meyen, 1834	*Ecklonia* thalli
Orthopyxis caliculata (Hincks, 1853)	brown alga
Clytia hemisphaerica (Linnaeus, 1767)	filamentous red alga
Phialella quadrata (Forbes, 1848)	brown alga
Amphisbetia minima (Thompson, 1879)	*Ecklonia* hold fast
Plumularia ?obliqua (Johnston, 1847)	*Ecklonia* hold fast
Plumularia setaceoides Bale, 1882	*Ecklonia* thalli
Monotheca pulchella (Bale, 1882)	?*Cystophora* thalli
Sertularella robusta Coughtrey, 1876	not given
Monotheca spinulosa (Bale, 1882)	not given
Aglaophenia plumosa Bale, 1882	*Ecklonia* hold fast

Acknowledgements

I thank Mrs C. McInnes for providing me with Dan's notes and permission to publish this resume of his researches on the Hydrozoa.

References

Bale, W. M. (1888). On some new and rare Hydroida in the Museum collection. *Proceedings of the Linnean Society of New South Wales* **3** (2), 745-799, pls. 12-21.

Briggs E. A. (1920). On a new species of crawling medusa (*Cnidonema haswelli*) from Australia. *Records of the Australian Museum* **13** (3), 93-104, pls 17, 18.

Hodgson, M. (1950). A revision of the Tasmanian Hydroida. *Papers and Proceedings of the Royal Society of Tasmania for the Year 1949*, 1-65.

McInnes, D. E. (1982). Some observations on hydroids at Black Rock (Port Phillip Bay, Australia). *The Victorian Naturalist* **99**, 159-163.

O'Sullivan, D. (1984). Description of *Rathkea lizzioides* sp. nov. (Hydromedusae: Rathkeidae) from Antarctica and a key to the genus. *Journal of Natural History* **18** (6), 861-868.

Péron, F., and Lesueur, C. A. (1809). Tableau des caractères génériques et spécifiques de toutes les espèces de méduses connues jusqu'à ce jour. *Annals du Muséum National d'Histoire Naturelle, Paris* **14**, 312-366.

Ralph P. M. (1966). Port Phillip Bay Survey 1957-1963. Hydroida. *Memoirs of the National Museum of Victoria* **27**, 157-166.

Russell, F. S. (1953). 'The medusae of the British Isles. Anthomedusae, Leptomedusae, Trachymedusae and Narcomedusae'. (Cambridge: UK).

Sars, M. (1835). 'Beskrivelser og Iagttagelser over nogle maerkelige eller nye I Havet ved den Bergenske Kyst levende Dyr. Bergen'. pp 81, pls 115.

Schuchert, P. (1996). The marine fauna of New Zealand: athecate hydroids and their medusae (Cnidaria: Hydrozoa). *New Zealand Oceanographic Institute Memoir* **106**, 1-159, figs 1-85.

Southcott, R. V. (1982). Jellyfishes (Classes Scyphozoa and Hydrozoa). *In* 'Marine Invertebrates of Southern Australia'. Part 1. Eds S.A. Shepherd and I. M. Thomas. pp. 115 -159.

Lendenfeld, R. von. (1884). The Australian Hydromedusae. Part IV. *Proceedings of the Linnean Society of New South Wales* **9** (3), 467-492, pls 12-17.

Lendenfeld, R. von. (1884). The Australian Hydromedusae. Part V. *Proceedings of the Linnean Society of New South Wales* **9** (8), 581-634, pls 20-29.

Watson, J. E. (1978). New species and new records of Australian athecate hydroids. *Proceedings of the Royal Society of Victoria* **90** (2), 301-331.

Watson, J. E. (1998). Troglodytes of a muddy bottom: the hydroid fauna of holes in the seabed. *In* 'Commemorative volume for the 80th birthday of Willem Vervoort in 1997'. Eds. J. C. den Hartog, A. C. van Bruggen, P. F. S. Cornelius and L. P. van Ofwegen. pp.247-256. *Zoologische Verhandelingen* **323**, i-xii, 1-448.

Werner, B. (1958). Die Verbreitung und das jahreszeitliche Auftreten der Anthomedusa *Rathkea octopunctata* M. Sars, sowie die Temperaturabhaengigkeit ihrer Entwicklung und Fort-pflanzung. *Helgoländer wissenschaftliche Meeresuntersuchungen* **6** (2), 137-170.